

Kelly (H.A.)

The reflux of air into
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THE REFLUX OF AIR INTO THE URETERS THROUGH THE AIR-
DISTENDED BLADDER IN THE KNEE-BREAST POSTURE.

BY

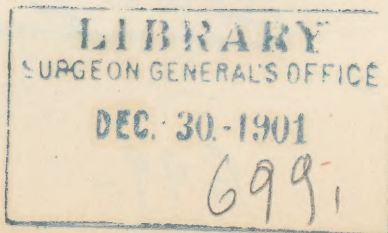
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THE important practical question as to the possibility of a reflux of fluids from the bladder into the ureters has been raised of recent years in contradiction to the views of the older writers.

The distinguished French surgeon, J. L. Petit, who lived from 1674 to 1750, in his great surgical work posthumously published, makes a declaration with which all subsequent writers and observers have substantially agreed until recently. He states¹ that there can be no escape of urine from the bladder into the ureters, because the ureters run obliquely between the coats of the bladder; and as the latter becomes distended and the inner coat is pressed against the outer coat, the ureter is necessarily compressed between them and so a reflux is prevented. He further states that it is well known that under continued over-distension of the bladder the ureters and the renal pelves also undergo great distension; but this is due, not to the back flow into the ureters, but because the urine which is secreted after the bladder has been filled, is now no longer able to enter that organ, and for this reason accumulates in the upper urinary tracts.

Lewin and Goldschmidt, in a paper published first in the *Berliner klinische Wochenschrift* (1893, vol. xxx., page 776) and later *in extenso* in *Virchow's Archives* (1893, vol. cxxxiv., page 33), called this accepted dogma into question upon the basis of a series of experiments upon rabbits, in which they found that colored fluids such as milk and methylene solutions, in the intact bladder moderately distended, with active muscular contractile power, were taken up into the ureters as far as the renal pelves by an active antiperistaltic movement, to be again discharged downward by peristalsis.

¹ Petit: "Traité des maladies chirurgicales, etc.," 1790, vol. iii., p. 4.



These experiments were repeated and verified by Courtade and Guyon,¹ who showed, however, that the phenomenon was far less likely to occur in dogs, where the muscular power of the bladder was greater and exercised a more efficient control over the ureteral extremities.

As a result of these experiments, the possibility of such a reflux into the human ureters has been admitted; upon the practical results flowing from such an admission I need not dwell. I wish here to record my own observations regarding the entrance of air into the ureters.

When the patient is put in the knee-breast position and a catheter introduced as far as the renal pelves, a little air sometimes enters and escapes later in bubbles with the discharge of the urine.

Sometimes, however, the air enters the ureter spontaneously before the ureteral orifice is touched, and, entering at the temperature of the room, it shortly becomes heated within the ureter to the body temperature, when it is forced out of the ureteral orifice in the form of a little bubble. This bubble has guided me to the position of the ureteral orifice in several instances where it was difficult to find.

More frequently the air enters spontaneously into an inflamed ureteral orifice on a side which is discharging pus (pyuria); in these cases, when the ureteral opening is concealed in the puffy, hyperemic mucosa, the little tell-tale bubble is a welcome sign which marks the site of the hole.

I have witnessed this phenomenon not less than twelve times. In one instance the bubbles of air and pus which marked the ureter escaped in a continuous stream; this, however, proved to be a case of pathological pneumaturia due to the presence of a large gas-forming bacillus in the kidney.

The fact that a gas will enter the ureters simply shows that they are not air-tight under some conditions, and does not prove in any way that they are not water-tight under physiological conditions.

I have never seen any harm come from the entrance of air, and it causes the patient no pain.

¹ Ann. des mal. des org. gén.-ur., Paris, vol. xii., p. 561.

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